

CLAIMS

[CLAIM1]

A vehicle power unit capable of electrically controlling a brake of a vehicle, the vehicle power unit comprising:

5 a battery as a power source of the vehicle;

an auxiliary power source having a capacitor unit and used in abnormal conditions of the battery, the capacitor unit comprising a plurality of capacitor cells;

10 a charge controller for charging the auxiliary power source from the battery;

a voltage monitor for monitoring a voltage of the capacitor unit during charging; and

15 a electronic controller for braking the vehicle by supplying power from the battery to the brake according to at least one of information from a brake pedal and information on a running state of the vehicle;

wherein the voltage monitor monitors if the voltage of the capacitor unit is not exceeding a predetermined voltage.

20 [CLAIM2]

The vehicle power unit of claim 1, wherein the voltage monitor monitors a voltage of the entire capacitor unit.

[CLAIM3]

25 The vehicle power unit of claim 2, wherein, when the voltage monitor detects that a voltage exceeding the predetermined voltage is applied to the capacitor unit during charging, the voltage monitor determines an abnormality, and the charge controller stops charging.

[CLAIM4]

The vehicle power unit of claim 3, wherein voltage V0 the voltage monitor determines as the abnormality is calculated by the following Equation:

$$V_0 = V_1 + \frac{1 - (F_{deg} + A_{deg})}{1 + (F_{deg} + A_{deg})} \times V_1 \times (T - 1)$$

wherein V1 is a withstand voltage of each capacitor cell, Fdeg is an initial dispersion in the capacitor cells, Adeg is an aged deterioration of the capacitor cells, and T is the number of the capacitor cells connected in series.

[CLAIM5]

The vehicle power unit of claim 1, wherein the capacitor cell is previously confirmed that an initial dispersion of voltage between cells is within a predetermined value.

[CLAIM6]

The vehicle power unit of claim 5, wherein the plurality of capacitor cells connected in series are charged at a predetermined voltage, and the initial dispersion in respective capacitor cell is selected from the charging voltage of the respective capacitor cell.

[CLAIM7]

The vehicle power unit of claim 6, wherein voltage V0 to be applied to the plurality of capacitor cells connected in series to select

the initial dispersion in the capacitor cells is calculated by the following Equation:

$$V_0 = V_1 + V_1 \times \frac{1 - F_{deg}}{1 + F_{deg}} \times (T - 1)$$

wherein V_1 is a withstand voltage of each capacitor cell, F_{deg} is an initial dispersion in the capacitor cells, and T is the number of the capacitor cells connected in series.

10 [CLAIM8]

A vehicle power unit, wherein a plurality of capacitor cells connected in series are charged at the applied voltage of claim 7, and a voltage of each capacitor cell is monitored to structure a capacitor unit by a combination in which no capacitor cell has a voltage higher than
15 withstand voltage V_1 and lower than the following Equation:

$$V_1 \times \frac{1 - F_{deg}}{1 + F_{deg}}$$